

Wilchester Elementary **SCIENCE FAIR 2012**



Information Packet

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**This Science Fair Information Packet is also available on the
Wilchester PTA website at www.wilchesterpta.com.**



Timeline

1. **Tuesday, January 10**
Science Fair Kick Off presentations to 4th & 5th Graders, 2:00 p.m., Cafeteria
2. **Tuesday, January 10**
Parent Information Meeting at 7:00 p.m. in the Library. (General overview for all grades at the beginning, 4th & 5th specifics at 7:15.)
3. **Tuesday, January 17**
Science Fair Information Sheet due from every 4th and 5th grade student. Give this to your homeroom teacher. (You can turn it in early, too.)
4. **Thursday, February 23**
Science Fair Projects are due between 7:45-8:00 a.m. in the gym.
Students and families are welcome to see and enjoy the Science Fair.
3-6 p.m. – Judging. Science Fair closed to visitors.
5. **Friday, February 24**
7:30-8:00 a.m. - Donut breakfast for 4th & 5th grade participants and parents on Hard Top.
8:00 – 8:30 a.m. - Awards Ceremony for students and families in school Cafeteria (3rd, 4th, and 5th grades attend). Winning participants (1st – 3rd place) will give a 5-minute presentation of their projects.
Projects remain on display in gym until 9:00 a.m.; 4th & 5th pick-up projects after specials or parents may take home.



Requirements for Science Projects

Your Science Project should be displayed on a standard **3-part folded project display board**. Every project must include the following sections, which should be clearly identified on your display board:

1. **Title** – This is the name of your project. It should appear at the top of your display board.
2. **Problem** – The problem **MUST** be stated in question form. What question are you trying to answer? A good format for the question is “What is the effect of **this** on **that**?”
Helpful Hint - Problems Question - for example: "Which type of material absorbs the largest volume of liquid: soil, gravel or sand?" Students should refrain from using the words "better or best". Do not say: "Which material: soil, gravel or sand absorbs better (or best)."
3. **Hypothesis** – Using complete sentences, explain what you think the answer to your problem question is. It is okay for you to be wrong here. It is fun to learn something new through your science project experience. You can use a "brand name" in your Hypothesis, but we encourage the student to make the experiment more than a comparison of brands.
Helpful Hint - The students **MUST** explain their thinking in detail - for example: "I think that the _____ will absorb the largest volume of liquid **BECAUSE** compared to the other two it _____. Please make sure your hypothesis explains your thinking in detail (why or because). This is an expectation that our teachers are discussing with their students in the classroom.
4. **Materials** – List **ALL** the materials and equipment used in your Science Project. Be specific. What did you need to *gather*? For example, 6 slices of white bread, 4 clean glass baby food jars, measuring spoons, etc. There is no need to list obvious items such as your hands or your desk.
5. **Procedure** – This is a step-by-step set of directions on how you did the experiment. Numbering each step will make it easier for everyone to understand what you did. An observer should be able to *recreate* your experiment from these directions.

Trials -- In doing your project, you should repeat the steps of your procedure at least 3 times for each manipulated variable. This way, you have at least 3 sets of information to measure and record. These repeated steps are called trials and they may be done simultaneously. For example: If a project is looking at the effects of something on three different types of plants - you would need 3 sets of three plants or a total of nine plants.



Variables -- All science projects have many variables which may be set up to test lots of different questions. In our Science Fair, you may test the effect of only **ONE** variable. You may measure as many outcomes (responding variables) as you wish. ALL other variables and aspects of the project must remain the same for every trial. **In the Procedure section of your project display, classify all the variables of your project** as one of the following:

Controlled Variables – These are the parts of the experiment that you controlled by keeping them the same throughout the experiment. Examples might be the same amount of sun, type of soil used, amount of water, etc.

Manipulated Variable – This is the part of the experiment that you are testing. This is the variable that you adjust on purpose in order to observe what happens. You may have only **ONE** manipulated variable.

Responding Variable(s) - This is the outcome(s) that happened as a result of the experiment. This is the part which you measure and record for your results. This could also be called a dependent variable. It is dependent on the changes you made to the Manipulated Variable. You may measure as many different responding variables as your project allows. In fact, your project will be more interesting and more conclusive if you measure more than one outcome.

One last note about variables: Another way of thinking about these variables is illustrated by the **Problem Question**:

What is the effect of [the manipulated variable] on [the responding variable] ?

- Observations** – Collect data by observing and measuring your **responding variables**. Use charts and tables to show your data. Not all outcomes are quantifiable. Descriptions, drawings and photographs are data too. Properly label all graphs.

Organize your data by drawing graphs or diagrams. This will help you see patterns and decide what the information from your data means. You should be able to **compare** the results each time you adjust your manipulated variable.

Your project display must include at least one graph drawn by hand showing your results. Additional graphs may be generated by hand or on a computer. Typically, on an XY graph or bar chart, the Manipulated Variable is shown on the X axis and the Responding Variable is shown on the Y axis.



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Your observations of each trial should be reasonably similar. If you observe inconsistent results from your trials, double check that the controlled variables were indeed held constant. Was the weather consistent? Did one of your siblings pour juice on your project? This is why at least three trials are required! If one trial is completely wacky, don't ignore it. Include the wacky data in your report and explain why you think it's erroneous.

Don't despair if your results still don't look "right". Think of other explanations for the results. Perhaps your hypothesis was wrong! This is okay! Most importantly, be ready to learn from your project experience.

7. **Conclusion** – Using complete sentences, re-answer the problem question using what you learned from your observations. Remember, you are **comparing** all your results. This is a very important part of the science fair display because it shows that you learned something from your experience. A thorough conclusion will be at least one paragraph.
 - Be **specific**. For example, "The plants which were fed plant food grew an average of 3 inches taller in the two-week period than the plants which did not receive plant food." Or, "The plants which were fed plant food grew an average of 4 more leaves in the two-week period than the plants which were not fed." These sentences are more informative than, "The plants which were fed plant food grew more."
 - Include whether your **hypothesis** was correct. If you learned something new or unexpected, this will be different than your hypothesis.
 - Try to explain **why** the results occurred. If you encountered problems during your work, you may discuss what impact these issues may have had on your results. Scientists are always learning from unexpected results. For example if you were testing plant food, you may discover that one of the controlled variables could have been set differently. You could write: "None of the plants grew as much as I expected. I think I should have watered all of them more."
 - Try to think of other uses for your experiment. "Farmers should use plant food to help their crops grow better."
 - Make note of where/how you got your project idea. If you chose an idea you've seen before, simply state that you saw it before and were interested in it. Include the title and author of any book used. If the project was an original idea of your own, explain why you became interested in it.



Reminders/Rules

General Reminders/Rules:

1. The objective of your Science Fair project is to answer a question by **comparing** the results of an experiment. This is not to be confused with a scientific **demonstration**.
2. **Websites** can be good sources for ideas, but make sure the project fits our format. Don't forget to **credit** the source of your project idea. The public library is another good resource.
3. **No Guns** used in your experiment - no BB guns, water guns, Nerf guns, marshmallow guns
4. **No animals or insects** can be involved in your project – alive or dead. (This includes your pets, ants, bugs, etc.) You can use animal products available at the grocery store like chicken eggs or bones, cooking ingredients, etc.
5. **No experiments on siblings, please.**
6. **No deliberate growing of bacteria in petri dishes, as harmful bacteria could potentially be grown.**
7. No experiments that could cause danger to someone.
8. Fourth and fifth graders may work in pairs or alone. **Once you turn in your project sheet with a partner listed, you cannot change your partner.**
9. Do not buy expensive materials for your project before you have received approval from both your teacher and the PTA Science Fair Committee for your Science Fair project.

Display Rules/Reminders:

10. Your project should be displayed on a **standard 3-part folded display board** which can be found at a number of stores including office supply stores, Michaels and even Walgreens.
11. No additional items may be displayed. Only items that are affixed to your 3-part board may be displayed.



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12. Except for the title, the main parts of your project should be identified with a **heading**. (Problem, Hypothesis, Materials, etc.)
13. Make sure the information on the display board is neat and check your spelling. You may type or handwrite your work. You may use computer graphs, but **at least one graph must be drawn by hand**. Remember that you are demonstrating YOUR skills, not the computer's features or your parents' expertise.
14. Write your name(s) and your teacher's name on the **BACK CENTER & BOTTOM** of the display board in standard sized print. **Do not write your name on the front of the display board or in the two (2) side flaps or in huge lettering. We will have to cover it up if you do. For the K-3 projects only, please put teacher's name and grade on the front with the title.**
15. You can use photos of your experiments as part of your display, but **NO RECOGNIZABLE PERSONAL PHOTOS (for example, faces) ARE ALLOWED for 4th and 5th grade projects. They are allowed in K-3 projects.** In other words, we should not be able to tell who anyone is from your photos. Do not have your name or initials on any photos either.
16. You cannot actually perform any experiments nor do any demonstrations as part of your display on the day of the Science Fair. **Neither students nor parents (other than Science Fair volunteers) will be present during judging.**
17. Our judges will be here **Thursday, February 23, 2011** to look at the 4th and 5th grade science fair projects and fill out the judging sheets. **Judging will be based on ALL of the requirements of the project**, and on overall presentation including creativity and neatness.
18. All 4th and 5th grade students will receive a **certificate** for their participation and a donut party on Friday, February 24th, 7:30 am – 8:00 am.

Good luck and work hard on your project. **You may call or e-mail Melynda Boerm or Caroline Roberts with any questions.**

Melynda Boerm
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Caroline Roberts
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281-948-0600



Science Fair Project Ideas

You may also check out ideas on-line.

One good website is www.all-science-fair-projects.com

The Houston Public Library is another good resource. Kendall Library (our nearest branch) has a section of science fair idea books.

1. Which solid fuel produces the most heat? or What is the effect of the type of solid fuel on the amount of heat produced?
2. Do people remember more details from an expected or unexpected event?
3. Which truss system can hold up the most weight?
4. What boat design can hold the most weight? Or travel the farthest? Or go the fastest?
5. Which metals conduct heat best? or What is the effect of different metals on conducting heat?
6. Which material makes the best heat insulator? or What is the effect of different materials on insulating heat?
7. Which color of liquid absorbs the most heat? or What is the effect of the color of a liquid on how it absorbs heat?
8. Which color container absorbs the most heat? or What is the effect of the container's color on how well it absorbs heat?
9. Which color container cools off the quickest?
10. Do black bottom pools keep the water warmer?
11. What are the effects of swimming pool water (chlorine) on hair?
12. Does a magnetic field affect the growth of beans?
13. Does electricity affect the growth of beans?
14. How do detergents affect the growth of plants?
15. Do plants grow better with tap water or distilled water?
16. Do roots always grow down?
17. Do mirrors affect the way plants grow?
18. Does leaf surface area affect plant growth?
19. Under which color cellophane do plants grow best?
20. Can you give a plant too much fertilizer?
21. Do seeds sprout better in cold or hot climates?
22. Does acid rain affect the germination of seeds?
23. Under which thickness of plastic do radishes grow best?
24. Does aspirin prolong the life of cut carnations?
25. What are the effects of water on different types of wood?



Suggested Action Plan

- Choose a partner with similar work habits and similar schedule. Remember you cannot change partners once your project sheet is turned in.
- Select a project topic which interests you and fits the guidelines.
- Complete Science Fair info sheet – Keep a copy for your notes
- Set up as many work sessions with your partner as needed to complete your project. Remember, don't underestimate the amount of time it takes to complete the experiment and create the display board!
- Make a list of all the materials you will need.
- Write down your procedure in numbered steps. If, during your project, you realize your original procedure isn't exactly right, CORRECT IT!
- Plan what measurements you expect to take by making a blank chart. It may look like this:

Manipulated Variable eg. Water	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5
None					
1/4 cup					
1 /2 cup					
3/4 cup					
1 cup					

Make a separate blank chart for every Responding Variable (outcome).

Now you are ready to begin the experiment. Gather your materials.

- Following your written procedure, complete all the trials and fill in your data chart(s) with measurements. This step may take less than an hour or several days depending on your project.
- If you can, find totals, calculate averages etc. with your data. Draw graphs showing your data.
- Write a rough draft of your conclusion following the instructions.
- RE-WRITE all of this information on your project display board. Make it neat and colorful!



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Tally Sheet for Judges

Title of Project: _____ Project # _____

TITLE: The title should be clear and easy to identify No title = 0 points; Poor title = 1 point; Good title = 2 points	
PROBLEM: To what degree is the problem new and/or different and how well is it written? The problem should be clearly asked in the form of a question. No problem statement = 0 pts. Incomplete problem statement = 1 pt. Complete problem statement and well-written = 2 pts. Complete, well-written problem statement and idea is new and/or different = 3 pts.	
HYPOTHESIS: The hypothesis should be a testable prediction and written in a complete sentence(s). No hypothesis = 0 pts. Incomplete hypothesis = 1 pt Hypothesis present, but not completely testable = 2 pts Well-written, testable hypothesis = 3 pts	
MATERIALS: Materials list should include all materials that need to be gathered. No materials list = 0 pts; incomplete materials list = 1 pt; complete list = 2 pts.	
PROCEDURES: To what degree do the experiment's steps connect the hypothesis, data and results? Steps are not listed and/or numbered = 0 pts Steps are incomplete and not listed step-by-step = 1 pt Steps are complete and listed step-by-step = 2 pts	
Controlled variable identified clearly and correctly = 0-2 pts	
Manipulated variable identified clearly and correctly = 0-2 pts	
Responding variable identified clearly and correctly = 0-2 pts	
A minimum of three trials were performed = 2 pts	
OBSERVATIONS: Did the student collect enough data to support the results? No quantitative data collected = 0 pts Insufficient data collected = 1 pt Sufficient data collected (data for minimum of three trials) = 2 pts Data collected above expectations = 3 pts	
Data shown in table format = 2 pts	
Graphs are well presented and easy to understand = 0-2 pts	
Display includes at least 1 hand-drawn graph = 2 pts	
CONCLUSION: How well are the results interpreted? No interpretation of data = 0 pts Partial interpretation of data = 1 pt Correct and appropriate interpretation of data = 2 pts Comprehensive and significant interpretation of data, with use of math skills such as averages or percentages = 3 pts	
Conclusion includes basic conclusive sentence = 2 pts	
Hypothesis is reviewed = 2 pts	
Student refers specifically to data = 2 pts	
Student cites application to situation outside of experiment = 2 pts	
OVERALL: Project is a creative and interesting idea = Score 0-5 pts The presentation is clear, well-organized and easy to follow = Score 0-5 pts	
TOTAL POINTS (Maximum points = 50)	



Science Fair Information Sheet

Student Information:

Student Name: _____ Phone: _____

Teacher: _____

Partner's Name: _____

Partner's Teacher: _____

Problem Question: (Fill in the blanks.)

_____?

Hypothesis: (Remember to write a complete sentence.)

Student Signature

Parent Signature

**Every student must complete this form. It is due
Tuesday, January 17, 2011. Turn it in to your
homeroom teacher.**